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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tetsuya Nagashima

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EXAMINER

YACOB, SISAY

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,867	Applicant(s) NAGASHIMA, TETSUYA	
	Examiner SISAY YACOB	Art Unit 2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-6 and 11-20 is/are rejected.
- 7) ☒ Claim(s) 4 and 7-10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The application of NAGASHIMA for "Light scattering type smoke detector" filed on May 17, 2006 has been examined.

Claims 1-20 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential element/function, such omission amounting to a gap between the elements/function. See MPEP § 2172.01. How is type of smoke identified? The claim does not provide any means to which this claimed limitation is made possible.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-3 and 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by the U.S. Patent to LEAVITT et al. (4,616,928).

As to claim 1, Leavitt et al. discloses a light scattering type smoke sensor comprising: a sensor body (*Item 12 of figure 1*); a light-emitter (*Item 16 of figure 1*) that is incorporated in the sensor body to emit light toward an open smoke-sensing space (*Item 15 of figure 1*) located outside the sensor body (*See figure 1*); a light-receiver (*Item 17 of figure 1*) that is incorporated in the sensor body to receive scattered light generated by the light emitted from the light-emitter to the smoke-sensing space, and to output a light-received signal corresponding to an amount of received light scattered; and a fire judging unit (*detection circuit; Col. 3, lines 50-54*) that judges presence/absence of fire occurrence based on the amount of received light identified by the light-received signal output from the light-receiver (*Col. 3, line 44 - Col. 4, line 4*).

As to claim 2 (depends on 1), the claimed limitation as set forth above in claim 1, further, Leavitt et al. discloses wherein the fire judging unit (*detection circuit; Col. 3, lines 50-54*) judges the present/absence of the fire occurrence based on the amount of received light (*based on predetermined increase by item 17*) and a differential value of the amount of received light (*Col. 3, line 44 - Col. 4, line 4*).

As to claim 3 (depends on 2), the claimed limitation as set forth above in claim 2, further, Leavitt et al. discloses wherein the fire judging unit judges that fire occurs when the amount of received light exceeds a predetermined fire threshold (*based on predetermined increase*) and the differential value of the

Art Unit: 2612

amount of received light is equal to or lower than a predetermined false alarm threshold (*inherently, the amount of received light that is equal to or lower than the specific predefinable threshold is a false alarm threshold; Col. 3, line 44 - Col. 4, line 4*).

As to claim 13 (depends on 1), the claimed limitation as set forth above in claim 1, further, Leavitt et al. discloses a mutual crossing point of the light axis of the light-emitter and the light axis of the light-receiver in the smoke-sensing space is at least approximately 5 mm away from the sensor body (*See figure 1*).

As to claim 14 (depends on 1), the claimed limitation as set forth above in claim 1, further, Siber et al. discloses at least one portion of an outer surface of the sensor body is configured by an insect avoiding material (*item 24 of figure 1*), or an insect avoiding agent is applied or made to permeate to at least one portion of the outer surface of the sensor body (*since the smoke detector is cover it inherently has avoid insects; See figure 1*).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2612

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 6, 11-12 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over LEAVITT et al.**

As to claim 6 (depends on 1), the claimed limitation as set forth above in claim 1, but, Leavitt et al does not expressly disclose the light-emitter comprises a plurality of light-emitters.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the smoke sensor of Leavitt et al. by incorporating a plurality of light-emitters, so as to provide a redundant sensing system by using multiple sets of light emitter and light receiver combinations to facilitate comparison of sensor outputs for confirmation of detection to prevent/reduce false detections.

As to claim 11 (depends on 6), the claimed limitation as set forth above in claim 6, further, it would have been obvious to one of ordinary skill in the art at the time the invention was made that when the plural light emitters include at least 2 light emitters, their axis don't have to all align with the axis of the light-receiving element(s) in the smoke sensor of Leavitt et al., so that the plural light-

Art Unit: 2612

emitters can be arranged at solid angles, so that planes including respective light axes of the plural light-emitters and the light axis of the light-receiving element are substantially not identical with each other, without changing the functionality of the device.

As to claim 12 (dependent on claim 6), the redundancy setup to confirm true detection by comparison of detection results from the plural sets of emitter-receiver combinations as claimed has already been established above in the consideration of claim 6. (Since the claimed identifying of a type of the smoke has not been provided with any means by which that is accomplished, it is being broadly interpreted that the confirmation process of the redundancy detection identifies the type of smoke as the actual smoke intended to be detected/monitored.)

As to claim 15 (depends on 1), the claimed limitation as set forth above in claim 1, further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the smoke sensor of Leavitt et al. by have the light-receiver angle to be set at different value including having an angle of field of view not larger than 5 degrees, because it is well known in the art and one skilled in the art may arrange the angles through routine experimentation, which does not involve an inventive steps.

As to claim 16 (depends on 1), the claimed limitation as set forth above in claim 1, further, is known in the art to use the light-emitter emits collimated parallel beam, as it would be a designers choice as to what type of conventional light emitter to use.

8. Claims 5, 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over LEAVITT et al. in view of the U K Publication of Nagel (2 054 922 A).

As to claim 5 (depends on 1), the claimed limitation as set forth above in claim 1, further, Leavitt et al. does not expressly disclose the fire judging unit judges that fire occurs, when the amount of received light exceeds a predetermined first fire threshold for a time equal to or longer than a predetermined first set time, and the amount of received light exceeds a predetermined second fire threshold which is higher than the first fire threshold for a time equal to or longer than a predetermined second set time which is longer than the first set time.

In the same field of endeavor, Nagel discloses a light scattering type smoke sensor judges that fire occurs, when the amount of received light exceeds a predetermined fire threshold for a time equal to or longer than a predetermined set time (Page 1, lines 119-128).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the smoke sensor of Leavitt et al. by incorporating the sensor for determining the fire based on set time, as disclosed by Nagel, so as to provide more accurate detection by allowing set time to ensure it not a false alarm condition, because both prior arts are directed to a light scattering type smoke sensor, one skilled in the art would be aware of the disclosures and Nagel discloses the claimed limitations.

As to claim 17 (depends on 1), the claimed limitation as set forth above in claims 1 and 6, further, Nagel discloses a logarithmic amplifier which amplifies the light-received signal output from the light-receiver (Page 1, lines 100-118).

As to claim 18 (depends on 1), the claimed limitation as set forth above in claims 1, further, Nagel discloses a light emission controller that drives the light-emitter to intermittently emit light by using a modulated light-emission signal; and an amplifier that amplifies the light-received signal output from the light-receiver in synchronization with the modulated light-emission signal (Page 1, line 100 – Page 2, lines 20).

As to claim 19 (depends on 1), the claimed limitation as set forth above in claims 1, further, Nagel discloses a light emission controller that drives the light-emitter to intermittently emit light by using a modulated light-emission signal, wherein: the light-emitter emits light within a visible light wavelength band; and the light emission controller drives to intermittently emit light at a light-emission pulse width of equal to or smaller than 1 millisecond (it would have been obvious to set the time at any value depending on the trade off between power saving and greater accuracy of detection; Page 1, line 100 –Page 2, lines 20).

As to claim 20 (depends on 19), the claimed limitation as set forth above in claims 1, further, Nagel discloses the light emission controller sets a total light emission time period in an intermittent light emission equal to or smaller than 1 millisecond (it would have been obvious to set the time at any value depending on the trade off between power saving and greater accuracy of detection; Page 1, line 100 –Page 2, lines 20).

Allowable Subject Matter

9. Claims 4 and 7-10 are objected to as being directly or indirectly dependent upon a rejected base claims 1, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

10. The following is an examiner's statement of reasons for allowance: The prior arts of record fail to disclose, teach or suggest claimed limitations:

Claim 4, limitations "the amount of received light exceeds the predetermined fire threshold, and the differential value of the amount of received light exceeds the predetermined false alarm threshold, the fire judging unit checks whether the amount of received light exceeds a predetermined obstacle threshold or not when a predetermined time elapses since the time the differential value exceeds the predetermined false alarm threshold, and judges that there is an obstacle for fire sensing when the amount of received light exceeds the obstacle threshold." in the context of the claimed invention.

Claim 7, limitations: "the light-emitter comprises a first light-emitter that emits light of a first wavelength, and a second light-emitter that emits light of a second wavelength which is shorter than the first wavelength; and a first scattering angle formed by mutual crossing of a light axis of the first light-emitter and a light axis of the light-receiving element is smaller than a second scattering

Art Unit: 2612

angle formed by mutual crossing of a light axis of the second light-emitter and the light axis of the light-receiving element." also, is not disclosed by prior arts on the record.

Claim 8, limitations: "a central wavelength of the first wavelength is equal to or longer than 800 nm; a central wavelength of the second wavelength is equal to or shorter than 500 nm; the first scattering angle falls within a range of approximately 20degree to 50 degree; and the second scattering angle falls within a range of approximately 100degree to 150 degree." furthermore, in the context of the claimed invention is not disclosed by prior arts on the record.

Claim 9, limitations: "the light-emitter comprises a first light-emitter and a second light-emitter; the first light-emitter emits light having a polarization plane vertical to a first scattering plane that passes through a light axis of the first light-emitter and a light axis of the light-receiving element; the second light-emitter emits light having a polarization plane parallel to a second scattering plane that passes through a light axis of the second light-emitter and the light axis of the light-receiving element; and a first scattering angle formed by mutual crossing of the light axis of the first light-emitter and the light axis of the light-receiving element is smaller than a second scattering angle formed by mutual crossing of the light axis of the second light-emitter and the light axis of the light-receiving element." in the context of the claimed invention.

Claim 10, limitations: "the first scattering angle is equal to or smaller than 80 degree; and the second scattering angle is equal to or larger than 100 degree." also, is not disclosed by prior arts on the record.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

MULLER et al. U.S. Patent No. 5,451,931; **FORSS et al.** U.S. Patent No. 4,306,230.

Correspondence

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SISAY YACOB whose telephone number is (571)272-8562. The examiner can normally be reached on Monday through Friday 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin C. Lee can be reached on (571) 272-2963. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-

Art Unit: 2612

free). If you would like assistance from a USPTO Customer Service

Representative or access to the automated information system, call 800-786-

9199 (IN USA OR CANADA) or 571-272-1000.

Sisay Yacob

09/30/2009

/S. Y./

Examiner, Art Unit 2612

/BENJAMIN C. LEE/

Supervisory Patent Examiner, Art Unit 2612